

AMENDMENTS TO THE SPECIFICATION

Please amend the specification, as follows:

Page 1, insert a new first paragraph, as follows:

This application is a divisional of U.S. Patent Application Serial No. 09/958,465, filed February 26, 2002, which is the National Stage of International Application No. PCT/AU00/00297, filed April 7, 2000; additionally, this application claims the priority to Australian Application No. PP 9613, filed on April 7, 1999, and Australian Application No. PQ 3843, filed on November 3, 1999, all of which are incorporated herein by reference.

Page 1, lines 3-6, amend the specification as follows:

This invention relates to projectiles and firing apparatus therefore and it has particular application to methods of and apparatus for firing projectiles for military use, although this invention is also applicable to civilian uses such as described in our simultaneously filed International application PCT/AU00/00296.

Page 1, lines 15-22, amend the specification as follows:

This invention has particular application to projectiles which are fired from a barrel assembly having a plurality of projectiles arranged in-line within the barrel and which are associated with discrete selectively ignitable propellant charges for propelling the projectiles

sequentially through the muzzle of the barrel. Sealing engagement is provided between projectiles and barrel so as to prevent rearward travel of an ignited propellant charge to the trailing propellant charge. Such ~~barrels~~ barrel assemblies will be referred to hereinafter as of the type described. Such arrangements are illustrated in our earlier International Patent Applications.

Page 4, line 19, amend the specification as follows:

DESCRIPTION OF PREFERRED EMBODIMENTS BRIEF DETAILS OF THE DRAWINGS

Page 4, line 25, amend the specification as follows:

~~FIG. 5 illustrates a pod of grenade firing barrel assemblies is a diagrammatic cutaway end view of a cluster of barrel assemblies;~~

Page 4, line 26, amend the specification as follows:

~~FIG. 6 is a diagrammatic cutaway end view of a cluster of barrels illustrates a pod of grenade firing barrel assemblies;~~

Page 5, lines 2-8, amend the specification as follows:

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The barrel assembly 10 illustrated in Fig. 1 has multiple grenade carrying projectiles 11, for grenades of substantially known form, loaded or stacked in a rifled barrel 12 to impart spin upon firing for activating the an arming device.

However the a rupturable propellant cup or high pressure chamber 13 is fixed to the projectile 11 for dispensing discharging from the barrel with the projectile to clear the barrel for the following firing 12 for firing the following projectile. This chamber 13 exhausts through exhausts ports 14 into the barrel space between the stacked projectiles 11, which space forms the a low pressure chamber 15.

Page 5, lines 11-15, amend the specification as follows:

Each projectile 11 includes a projectile body 17, which in this embodiment is a grenade housing 18 housing a grenade 22, and a trailing sleeve or collar assembly 19 which is retained thereon for limited relative axial movement relative to a head part 20 of the grenade housing 18. The sleeve 19 has a leading end head part 20 which tapers inwardly to an internal collar 21 which extends into a complementary shaped external recess 23 formed in the grenade housing 18. The sleeve 19 tapers outwardly at its rear end 24 to engage over a corresponding tapered leading face 25 on the head part or nose 20 of the projectile 11 stacked therebehind.

Page 5, lines 16-20, amend the specification as follows:

In use, as disclosed in our earlier inventions, loading or storing of the projectiles 11 into the barrel 12 forms a wedge type seal 26 between the leading end of the sleeve 19 and the trailing tapered face 27 26 of the head part 20 of the grenade housing 18, which seal prevents the ignition of the leading propellant spreading about the grenade housing to the propellant in the following round.

Page 5, lines 21-24, amend the specification as follows:

Loading also effects a further wedge type seal 28 between the rear end 24 of the trailing sleeve or collar assembly 19 and the leading face 25 of the head part 20 and expands the rear end 24 into operative sealing engagement with the barrel 12. Thus the sleeve or collar assembly to barrel seal forms a barrier to spreading of ignition thereabout to propellant charge in the trailing round.

Page 5, lines 29-33, amend the specification as follows:

The barrel assembly 30 illustrated in Fig. 2 is similar in configuration to that illustrated in Fig. 1, the main difference being the manner in which the sleeve or collar assembly 31 is retained on the projectile body or grenade housing 32 and the configuration in which the sleeve 31 confines a smaller low pressure chamber 33 between adjacent projectiles 35 into which the high pressure chamber 36 exhausts through ports 38.

Page 6, lines 1-23, amend the specification as follows:

The sleeve 31 also has a shallow wedge 34 at its leading end which may be expanded into sealing engagement with the barrel during loading, but which is released upon firing during the initial forward movement of the housing 32 and upon subsequent impact of the propellant chamber 36 with the back face of the return 27.

The barrel assembly 40 illustrated in Fig. 3 is also similar in configuration to that illustrated in Fig. 1, the main difference being the wedge sealing angles α and β between the trailing sleeve 31' and the grenade projectile housing 42. In this embodiment which is more suited to low pressure low muzzle velocity applications, the opposed ends of the trailing sleeve 31' formed by the sealing angles α and β of between 30° and 55° are sufficiently blunt as to resist outward splaying into sealing engagement with the barrel under the influence of propellant pressures. Typically these would be in the order of 3000psi to 5,000psi with muzzle velocities of about 70m/sec and 250m/sec respectively.

It will be seen that the bulbous nose part 43 of the projectile body housing 42 is hollow for carrying explosives, or fuel as referred to in relation to Fig. 11. As in the embodiments illustrated in Fig 1 and 3 the propellant 37 in the high pressure chamber 46 is selectively ignited to expel high pressure gases through the trailing ports 39 into the low pressure chamber 33' by a detonator 16. The detonator 16 is triggered through an electrical circuit which uses the projectile column as one part of the circuit, the barrel 41 being made of insulating material or so lined and with the circuit completed by an imbedded embedded insulated wire 29 leading from the primer 16 to a contact 29' on the projectile surface which is aligned when loaded, with a complementary contact 44 supported in the barrel 41.

Page 6, lines 27-33, amend the specification as follows:

The barrel assembly 45 illustrated in Fig. 4 substantially corresponds in mechanical configuration to the Fig. 3 embodiment. However the high pressure chamber 46 is disposed externally of the barrel and communicates with the low pressure chamber 47, which acts as an expansion space, through aligned ports 48 and 49 in the wall of the barrel 50 and trailing sleeve 51, respectively. As shown cutaway in Fig. [[6]] 5 the high pressure chamber 46 is of such configuration that it will fit snugly into the space bounded by the adjacent side walls ~~52 and 53~~ 50 of further barrels of a cluster of barrels 45.

Page 7, lines 7-18, amend the specification as follows:

In all the above embodiments the propellant in the high pressure chamber is adapted to be ignited by electronically controlled ignition means, as known from described in our earlier International Patent Applications.

As illustrated in Fig. [[5]] 6, a typical weapon according to an embodiment of this invention includes a cluster of barrel assemblies 55 adapted to fire grenades 56 and contained in a pod 57 such that a selected number of near simultaneously exploding grenades may be fired at a time. The grenades 56 are fired selectively from the pod 57 by computer control. The weapon in the illustrated embodiment contains ninety-eight barrel assemblies each containing stacked grenades 56 and having selectively ignitable internal or external propellant charges. In this embodiment the pod 57 is carried on a turret mounting 58 whereby the barrels may be swivelled about vertical and horizontal axes for aiming purposes.

Page 8, line 31, to page 9, line 2, amend the specification as follows:

The projectile firing pod 70 is illustrated diagrammatically in Fig. 10 and cutaway to illustrate only two barrel assemblies 71 of the type described which would be contained within a rectangular pod housing 72. The barrel assemblies 71 are swivel mounted in spaced apart relationship in the pod housing 72, being suspended from an upper wall 73 from respective ball type mountings 74.

Page 9, lines 21-23, amend the specification as follows:

Accordingly, it will be seen that by controlling the position of the hydraulic ram 81 the barrel assemblies can be positioned with their axes vertical and parallel, inclined to the vertical and parallel, or with their axes in a splayed attitude relative to an axis of the pod.

Please add the Abstract contained on a separate sheet and attached to this Amendment.